ASIA PACIFIC INITIATIVE

P.O. Box 32, 770 Pacific Blvd. South, Third Floor, Vancouver, B.C., Canada V6B 5E6

EXPORT MARKET CAPABILITIES OF THE BRITISH COLUMBIA ENVIRONMENTAL INDUSTRY

89-04961/

ASIA PACIFIC INITIATIVE

April 10, 1989

The Honourable John Jansen
Minister of International Business & Immigration

The Honourable Mary Collins
Associate Minister of National Defence

Dear Ministers:

This report was commissioned by the Environmental Sub-committee of the Export of Services Task Force to assess the export market capabilities of the British Columbia environmental industry. The study identified more than 400 companies which provide environmental products and services, of which an estimated 175 draw a major portion of their income from the environmental industry. Many of these companies have state of the art expertise in their service area and are actively exporting their expertise and products. The report concludes that there is a growing international market for the services of B.C. firms, and makes specific recommendations to government on how to assist the industry in building its position in the export market.

As part of the study, a directory has been compiled providing detailed information about the goods and services provided by firms within the B.C. environmental industry. This directory is being distributed to government offices in Canada and overseas, and will be used by the organisers of Globe'90 in their marketing activities.

The Advisory Committee is pleased to present this report to government for its consideration. We would be pleased to provide assistance in the implementation of any of the recommendations in the report.

Yours sincerely,

Peter Lusztig
Chairman

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Chairperson,
Asia Pacific Initiative Advisory Committee,
P.O. Box 32,
770 Pacific Boulevard South,
VANCOUVER, B.C.
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Dear Chairperson:

We are pleased to present the results of our study of the export market capabilities of the British Columbia environmental industry.

Our research shows that the B.C. environmental industry is continuing to grow and that export market demand is rapidly increasing, particularly in the Asia Pacific region. Accordingly, the industry and its members are well positioned to take advantages of developing opportunities in overseas markets. Detailed findings and recommendations from our review and analysis are summarized in the enclosed report.

We would like to thank Environment Canada, the Department of Regional Industrial Expansion, and Statistics Canada for their assistance with this important study. The outstanding assistance of the many companies which participated in our industry survey is also gratefully acknowledged.

Yours sincerely,

S. E. Dugal Smith,
Partner.

ASIA PACIFIC INITIATIVE ADVISORY COMMITTEE

EXPORT MARKET CAPABILITIES OF THE BRITISH COLUMBIA ENVIRONMENTAL INDUSTRY

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ASIA PACIFIC INITIATIVE ADVISORY COMMITTEE

EXPORT MARKET CAPABILITIES OF THE BRITISH COLUMBIA ENVIRONMENTAL INDUSTRY

EXECUTIVE SUMMARY

The Asia Pacific Initiative Advisory Committee (APIAC) has initiated this study of the British Columbia environmental industry.

APIAC is a private sector advisory committee appointed by federal and provincial Ministers under the Asia Pacific Initiative, the name given to a federal/provincial Memorandum of Understanding signed on December 16, 1986. This memorandum calls for the coordination of initiatives to enhance British Columbia and Vancouver as Canada's Pacific Centre for trade, commerce and travel.

The objectives of this study are to identify companies which are active in the B.C. environmental industry, to provide an economic profile of the industry, and to make recommendations to government on how to assist the industry in its export efforts. The results of our research are summarized as follows:

- The environmental industry includes private firms which provide goods or services that assist in improving, analyzing, or protecting the natural environment (air, water, land and renewable resources).
- In British Columbia, more than 400 companies provide environmental products and services. However, for many of these companies, these products and services are peripheral to the main focus of their business. An estimated 175 of these companies actually draw a major source of their income from the environmental industry.
- B.C. environmental companies employ some 4,600 people, 1,100 of which represent full-time environmental industry personnel.
- In 1987, the B.C. environmental industry recorded sales of an estimated $114.4 million, including exports of $67.6 million.
- The main export markets were the United States and the Asia Pacific region, accounting for 46% and 37% of exports respectively.

- CIDA provided the major source of export financing for environmental consultants during 1987 at 41%. Other sources of funds included working capital, the World Bank, the Asian Development Bank, and other international aid agencies.

- Many of these companies have state of the art expertise in their service area and are actively exporting their expertise and products.

- There is consensus among industry observers and members that business opportunities for environmental companies are increasing, particularly in the newly industrializing countries of Asia.

- Major areas of opportunity for the years ahead include resource management (agricultural lands, forests, fisheries, drinking water), pollution control consulting and technology, and software with environmental applications.

- British Columbia companies are positive about their capabilities to serve overseas markets but indicate they are constrained by high business development costs, lack of familiarity with foreign markets, and problems in obtaining financing.

- We recommend that government continue its efforts to assist the environmental industry in its export efforts by providing financial assistance with overseas business development expenses, by expanding agency funding, by encouraging more industry co-operation, and by the sponsorship of trade missions for environmental specialists.

- In addition, we recommend that coaching be provided for environmental specialists to assist them in obtaining work from the major funding agencies such as CIDA, the World Bank, and the Asian Development Bank.

- Finally, we recommend that further research be carried out into identifying industrial strategies for increasing exports of B.C. environmental goods and services to the Asia Pacific region.

INTRODUCTION

. The Asia Pacific Initiative Advisory Committee (APIAC) has initiated this study of the British Columbia environmental industry.

. APIAC is a private sector advisory committee appointed by federal and provincial Ministers under the Asia Pacific Initiative, the name given to a federal/provincial Memorandum of Understanding signed on December 16, 1986. This memorandum calls for the coordination of initiatives to enhance British Columbia and Vancouver as Canada's Pacific Centre for trade, commerce and travel.

. The objectives of this study are to identify companies which are active in the B.C. environmental industry, to provide an economic profile of the industry, and to make recommendations to government on how to assist the industry in its export efforts.

. In conducting our analysis, we have surveyed and interviewed some 133 B.C. companies and numerous individuals active in the environmental industry including representatives from Environment Canada, Statistics Canada, and the Department of Regional Industrial Expansion (Appendix A).

. This report summarizes the results of our research and includes a definition of the environmental industry, an economic review of the B.C. environmental industry, summaries of export opportunities and constraints identified by industry members, and our recommendations for assisting the industry in its export efforts.

. All figures in this report, with the exception of Appendix C, are based on 1987 data and pertain to the British Columbia environmental industry. Export figures represent sales of goods and services outside of Canada.

. As part of this study, we have developed a directory and database of the B.C. environmental industry. The directory may be obtained by writing to:

Asia Pacific Initiative
P.O. Box 32
Third Floor, 770 Pacific Blvd. South
Vancouver, B.C.,
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INDUSTRY DEFINITION

The environmental industry is divided into eight broad sectors: consulting, manufacturing, distribution, laboratory research, recycling/conservation, environmental enhancement, pollution abatement and control, and waste management. Because of the complexity of the industry, however, overlap does occur between sectors (e.g., a consulting firm may also provide laboratory or environmental enhancement services). The eight sectors are described as follows:

- **Consultants** provide a wide variety of advisory and pay for performance services ranging from general engineering services related to sanitation and pollution control, to highly specialized consulting services in archaeology, biotechnology, and socio-economics. Other consulting services include the design of software with environmental applications, pollution monitoring and measurement services, and professional services specifically focussed on the environmental industry.

- **Manufacturers and distributors** provide equipment and supplies for pollution control, waste management, water treatment, remote sensing and a variety of other activities related to the environment. Examples of these items include waste treatment equipment, water filtration systems, air fume scrubbers and electrostatic precipitators, and scientific instruments used to collect environmental data.

- **Laboratories** conduct research, develop methodologies, and provide analytical support services for other sectors of the environmental industry.

- The focus of companies in the **recycling/conservation** sector is on the sustainable development of renewable natural resources. Within this sector, recycling companies account for the highest proportion of sales. These companies provide collection and/or broking services for metal, paper, used oil, and other recyclable materials. Other activities in this sector include resource use planning and management, forestry and fisheries management programs, conservation practices for agricultural lands, and the development of alternate energy systems.

- The **environmental enhancement** sector includes companies which are involved in restoring and rehabilitating the environment (e.g.,

companies involved in clean up operations for oil or hazardous materials spills).

. The **pollution abatement and control** sector includes companies involved in the protection of the environment through research and industrial design activities.

. Major activities in the **waste management** sector include waste collection, toxic waste handling and transport, and the treatment of waste prior to storage or release.

. A more detailed presentation of the components of each of these eight sectors can be found in Appendix B.

. Recently, the federal Department of Regional Industrial Expansion defined the environmental industry as "establishments, both public and private which provide research, measurement, monitoring, planning, design, construction and management services and/or which design manufacture, install or maintain products that have as their major effect the conservation, protection or enhancement of the natural environment. Also included are establishments involved in the collection and dissemination of environmental information such as weather and climatological services."

. For this study, we have simplified this definition and have defined the environmental industry as private firms which provide goods or services that assist in improving, analyzing, or protecting the natural environment (air, water, land, and renewable resources).

. In British Columbia, more than 400 companies provide environmental products and services. However, for many of these companies, these products and services are peripheral to the main focus of their business. Thus they do not consider themselves to be in the "environmental business" but the construction, engineering, chemical, or manufacturing business.

. Because of the diverse nature and preliminary stage of the environmental industry, it is difficult to identify just which companies are part of the industry.

. In addition, there is no cohesive and well accepted industry association (likely because many environmental companies have more in common with non-environmental companies in the industries which they serve - such as forest products, aquaculture, or construction- than they do with each other). Thus the industry has had neither structure nor a united voice. It is hoped that the new Canadian Environmental Industry Association (which is still in the formative stage) will resolve this problem.

. A total of 133 companies considered themselves to be sufficiently environmentally focussed to agree to participate in this survey. Including the companies which did not respond, we estimate that there are about 175 companies in the British Columbia environmental industry. The companies that did not respond to our survey were, for the most part, sole practitioners. Thus we believe the data we collected from our survey are represenative of the industry as a whole.

. Participation in our survey was as follows:

Respondent Group	Responses	% of Total
Consulting Engineers	28	21%
Consulting Foresters	17	13%
Other Environmental Consultants	52	39%
Manufacturers and Distributors	32	24%
Recyclers	4	3%
Total	133	100%

. Financial data for the respondent groups are presented in the following section and in Appendix C.

THE B.C. ENVIRONMENTAL INDUSTRY: ECONOMIC PROFILE

EMPLOYMENT

- The 133 companies which responded to our survey reported total employment in B.C. of 4,621 during 1987.

- Of this number, 1,097 (24%) spent the majority of their time working in the environmental industry.

- For most companies, the number of environmental industry employees ranged from two to seven. Ten companies reported having more than thirty employees working in the environmental industry, including two companies reporting sixty. Together these ten companies accounted for 35% of the B.C. environmental industry workforce.

- Consulting firms employ the majority of the industry's workforce at some 71% or 780 employees.

- Manufacturers and distributors employ another 20% and the recycling group employs about 9%, as demonstrated in the chart below:

Respondent Group	Total Employees	Environmental Employees	% of Industry
Consulting Engineers	2,568	285	26%
Consulting Foresters	296	147	13%
Other Environmental Consultants	646	348	32%
Manufacturers and Distributors	1,008	216	20%
Recycling Companies	103	101	9%
	4,621	1,097	100%

Notes:

Some consultants also manufacture or distribute supplies and equipment. For the purpose of our study, we have included such companies in the "other environmental consultants" category.

These data do not include the employees of a large B.C. oil re-refining company which chose not to disclose their sales data. If this company were included, we estimate that the recycling sector would account for about 15% of the environmental industry workforce in British Columbia.

SALES

. In 1987, the B.C. environmental industry recorded sales of about $114.4 million - a 19% increase over 1986 sales of $95.9 million and a 40% increase over 1985 sales of $81.7 million. These figures indicate a steady comeback by the environmental industry after the depressed levels of 1982 - 1984. They also represent a strong rate of growth in industry export sales which is in part due to the competitiveness of the Canadian dollar in foreign markets.

. For 1987, sales were allocated among the survey respondent groups as follows:

Respondent Groups	1987 Sales ($000's)	% Change from 1986	% of Industry
Consulting Engineers	$ 26,480	35%	23%
Consulting Foresters	8,389	11%	8%
Other Environmental Consultants	16,455	8%	14%
Manufacturers and Distributors	29,621	14%	26%
Recycling Companies	33,483	22%	29%
	$114,428	19%	100%

. The four recycling companies which submitted data accounted for the major share of industry sales - some 29%.

. The manufacturers and distributors group also accounted for a large market share at 26% of industry sales. It should be noted, however, that one company alone accounts for more than 50% of these sales.

. Consulting engineers recorded the greatest percentage increase in 1987 sales at 35%. Recycling companies were second, posting increases in sales of 22%.

EXPORTS

. In 1987, the environmental industry recorded exports of $67.6 million, roughly 59% of 1987 sales. As the chart below indicates, recycling companies accounted for the major share of industry exports at 50% of the total. When recycling companies are excluded, industry exports total $34.1 million, representing about 42% of these groups' 1987 sales.

. Industry exports increased 24% over 1986. The other environmental consultants group recorded the highest increase in export sales at 61% followed by consulting engineers at 54%.

. 1987 exports for the survey respondent groups were allocated as follows:

Respondent Group	1987 Exports ($000's)	% of Sales	% of Industry
Consulting Engineers	$ 7,093	27%	10%
Consulting Foresters	1,578	19%	2%
Other Environmental Consultants	3,918	24%	6%
Manufacturers and Distributors	21,543	73%	32%
Industry excluding recycling	34,132	42%	50%
Recycling Companies	33,483	100%	50%
Total	$67,615	59%	100%

. The United States and the Asia Pacific region were the largest export markets in 1987 at 46% and 37% respectively. 1987 export markets for the survey respondent groups were allocated as follows:

	Cons. Eng.	Cons. For.	Enviro. Cons.	Man./ Distr.	Recyc.	Total	% of Total
			($000's)				
USA	$ 703	$ 150	$1,772	$14,218	$14,177	$31,020	46%
C/S America	722	254	90	2,440	-	3,506	5%
Europe	-	115	243	1,166	363	1,887	3%
Africa	4,199	484	749	330	-	5,762	8%
Asia Pacific	1,469	458	1,024	3,389	18,579	24,919	37%
Asia Other	-	117	40	-	364	521	1%
Total	$7,093	$1,578	$3,918	$21,543	$33,483	$67,615	100%

. Environmental industry exports by country for the Asia Pacific region in 1987 are presented as follows:

	Industry ($000's)	% of Total	Industry excluding Recycling ($000's)	% of Total
Australia	$ 1,428	6%	$ 1,428	23%
Brunei	1,334	5%	1,334	21%
China	1,423	6%	527	8%
Hong Kong	9	-%	9	-%
India	1,173	5%	724	11%
Indonesia	676	3%	676	11%
Japan	11,625	47%	30	-%
South Korea	1,994	8%	104	2%
Malaysia	757	3%	757	12%
New Zealand	43	-%	43	1%
Pakistan	2	-%	2	-%
Philippines	32	-%	32	-%
Singapore	515	2%	33	1%
Taiwan	2,893	12%	74	1%
Thailand	159	-%	159	3%
Other	856	3%	408	6%
Total	$24,919	100%	$ 6,340	100%

. As the chart above indicates, recycling companies accounted for the major share of Asia Pacific exports with Japan, South Korea, Taiwan, and Singapore being the main purchasers of their products (primarily scrap metal and paper).

. When recycling companies are omitted from the analysis, the distribution of exports is influenced accordingly, with five countries (Australia, Brunei, Malaysia, India and Indonesia) accounting for almost 80% of Asia Pacific region exports. (Brunei's position as one of the top five export markets in 1987 is largely the result of one major assignment). In 1987, Japan, Taiwan, and Singapore were not significant markets for B.C. environmental consultants or manufacturers.

EXPORT FINANCING

. Sources of export financing include working capital, the Canadian International Development Agency (CIDA), the Asian Development Bank (ADB), the World Bank, and other sources.

. From our survey, all but two of the recycling and manufacturing and distributing companies financed their exports through their own working capital.

. The consultants financed their exports as follows:

	Working Capital	ADB	CIDA	World Bank	Other	Total
			($000's)			
USA	$1,099	$ 0	$ 0	$ 0	$1,526	$ 2,625
C/S America	79	0	754	47	186	1,066
Europe	243	0	0	115	0	358
Africa	49	0	2,540	330	2,513	5,432
Asia Pacific	506	205	1,868	93	279	2,951
Asia (other)	117	2	38	0	0	157
Total	$2,093	$207	$5,200	$585	$4,504	$12,589
% of Total	17%	2%	41%	5%	35%	100%

. As the above chart indicates, CIDA was the most common source of funds in 1987, accounting for 41% of export financing. (The "other" category in the chart includes the African Development Bank, U.S. Aid, and other non-specified sources. Although the total for this category is significant, it represents the figures of just 9 firms.)

EXPORT OPPORTUNITIES AND CONSTRAINTS

. This section identifies opportunities and constraints facing the environmental industry based on the results of our province-wide survey. Suggestions and strategies to alleviate the problems and constraints are proposed and an assessment is made of the industry's capabilities to capitalize on Asia Pacific export opportunities.

. Appendix D presents a more detailed outline of the industry's responses to our questionnaire.

MARKETS OF OPPORTUNITY

. The companies in our survey overwhelmingly indicated that the markets which provide the greatest export opportunity are in the Asia Pacific region (including India). The United States was the second most mentioned region.

. Other areas of the world were also mentioned including Africa which was noted for its desperate need for environmental management but also for its lack of financial resources.

. Virtually every company which indicated a geographic market of promise indicated the Asia Pacific region or one or more specific countries within the region.

. China was the country mentioned most frequently (15 times), followed by Malaysia and Indonesia (8), Taiwan (6), and the Philippines (5).

. The forestry consultants were particularly optimistic about the China and Malaysia markets for their services.

. Of interest, only four companies mentioned Japan as a market of opportunity. This result is consistent with our financial survey, which indicated that in 1987 Japan accounted for less than 1% of industry sales (excluding recycling companies). One company with international experience noted competition from Japanese financial and technical influence as a constraint on Canadian firms doing business in the Asia Pacific region.

. Companies identified a wide variety of services and products which they saw export potential for in the years ahead.

. Engineering firms saw potential in:
  - pollution control technology;
  - water treatment technology;
  - designing water supply and wastewater management systems;
  - providing project management skills; and
  - projects related to agriculture and forestry.

. For environmental consultants and manufacturers, areas of opportunity include:
  - site assessment and remediation;
  - integrated resource management;
  - policy formulation related to environmental planning;
  - environmental impact assessments;
  - projects related to fisheries including the development of commercial fishery management plans;
  - projects related to water quality including potable water systems and effluent treatment;
  - pollution abatement;
  - improving the land base for agriculture and forestry;
  - small hydro and solar power use in aquaculture and agriculture;
  - computer software with environmental applications;
  - statistical analyses of air and water quality data; and
  - data acquisition and monitoring systems for environmental projects.

. Forestry consultants saw the need in overseas markets for:
  - forest management, logging, silvicultural and protection practices;
  - forestry computer applications;
  - integrated land use consulting;
  - assistance with extraction and planning;
  - technical training in resource management;
  - reversing forest cover loss;
  - environmental resource inventories;
  - database establishment and management;
  - management and financial expertise;
  - computer aided design mapping and digital terrain monitoring;
  - feasibility studies;
  - the prevention of erosion by water and desert encroachment; and
  - materials handling.

CONSTRAINTS TO ENVIRONMENTAL EXPORTS

. In our survey, companies were asked the question "What problems or constraints does your company (and industry) face in securing and performing work for clients outside Canada?" Because companies were surveyed independently and were not prompted for specific responses, common responses of even 10% to this open-ended question are significant. In addition, if 10% of the companies identified a common area of concern, then it does not follow that the other 90% is not concerned with this issue.

. Companies identified three major export constraints:
  - foreign market constraints;
  - business development cost constraints; and
  - funding agency and financing constraints

(See Appendix D for a summary of company responses).

. Foreign market constraints were mentioned by close to half of the respondents. Respondents cited unfamiliarity with overseas markets and how to go about marketing their services; language, culture, and foreign business practice barriers; and difficulties in obtaining foreign representatives.

. Business development cost constraints were mentioned by 49% of respondents. Small companies in particular cited their lack of money and time resources to actively pursue international work. Other common themes were high startup costs, the long lead times between negotiations and final payment, and the multitude of documents and contact points required to sell overseas.

. Sixteen percent of respondents cited problems with obtaining funding from international aid agencies, particularly CIDA. These respondents expressed dissatisfaction with CIDA's administration of funds for international work to B.C. companies. A further 12% of respondents cited problems obtaining financing with reasonable costs and terms from public and private sources.

SUGGESTIONS FOR ENCOURAGING EXPORTS

. Respondents provided a number of suggestions for improving the exporting of environmental goods and services.

. The most mentioned suggestion (32%) was that companies require assistance with their business development expenses (travel and marketing expenditures); with identifying overseas contacts through the sponsorship of business development tours; and with access to directories of contact people and market information guides and

briefing materials. Several respondents requested sustained funding for the Program for Export Market Development (P.E.M.D.) and related programs.

. Twenty-five percent would also like to see the government expand and simplify its agency funding and assist firms in securing financing and guarantees for exports.

. Twenty-three percent of respondents felt that exports could be increased if the industry co-operated more by forming consortia and providing package services.

. A further 10% of respondents suggested that CIDA should provide a greater portion of funding for Western firms and that the Agency should set up a Western office which would be more accessible to the B.C. industry.

. Other suggestions included increased government marketing efforts (9%), educating decision makers regarding the need for environmental management (8%), and forming joint ventures with foreign firms (6%).

ASSESSMENT OF ASIA PACIFIC REGION EXPORT OPPORTUNITIES

. Our research shows that, overall, the industry is positive about the opportunity to export services but somewhat less so regarding the export of goods.

. Because of higher costs of production in Canada, companies which manufacture or distribute low technology products find it difficult to compete in overseas markets, and therefore see more opportunity to serve the domestic market.

. Other specialist firms which provide high technology products, such as oceanographic instruments and equipment, see great opportunities for exports and are already active and successful in overseas markets. One such company which manufactures and distributes environmental equipment sees opportunities to serve as a "systems integrator" for environmental consulting firms.

. In the service area, many B.C. companies have state of the art expertise, particularly in consulting related to forestry management, fisheries, and environmental mapping. A number of B.C. firms are acknowledged as world leaders in these fields.

. Several companies cited a greater awareness among developing countries of the importance of managing their natural environment in order to ensure continued economic growth, the preservation of their

natural resources, and the quality of life. These countries are becoming increasingly aware of the detrimental ecological consequences of human encroachment and largely uncontrolled exploitation of their resources, particularly forests, and of the need to do something about it.

. One of the province's leading forestry consulting firms noted, however, that in many developing countries, social and economic problems are more pressing and therefore have more of a priority than environmental problems. Thus, although the need is great, opportunities for foreign environmental firms to supply services are limited by the budgetary constraints of these developing countries. Much of the environmental work conducted in developing countries is therefore funded by international agencies.

. In recent months, industry observers have noted that among the major funding agencies -- including the World Bank, US Aid, and CIDA -- there is a trend in integrating environmental issues into development projects. Both CIDA and the World Bank have recently announced plans to incorporate improved environmental guidelines into their development projects, and in CIDA's case, to support environmental enhancement projects. Should these agencies follow through on their intentions, an increase in the demand for the products and services of environmental firms can be expected.

. Currently, the B.C. environmental industry relies, to a significant extent, on the domestic resource industries to purchase its products and services. Because of the cyclical nature of these industries, however, their demand for environmental products and services fluctuates. Thus, the opportunity for B.C. environmental firms to diversify into overseas markets is attractive because it will ensure the continued growth and stability of the environmental industry.

. To its credit, the B.C. environmental industry currently exports almost 60% of its sales and this proportion has been increasing by 2% per year since 1985. However, about 40% of the industry is not involved in export sales and a large number of firms which do export have the capacity and capability to do more.

. British Columbia has a large variety of unique climatic zones and soil conditions for which major projects and major problems have been solved and this expertise is readily transferrable to other countries.

. The opportunities for exports of environmental services and products to the rapidly industrializing Asia Pacific region are substantial. As an example, the President of the Canadian Manufacturers Association in an address to the 1987 Fifth Pacific Rim

Opportunities Conference noted that "environmental protection and pollution control is a major new area of opportunity for consultants and equipment suppliers" and that "there is no entrenched competition in the area."

. In summary, our research shows that opportunities are increasing for environmental firms to export their goods and services. Moreover, the B.C. environmental industry is well positioned to capitalize on Asia Pacific export opportunities because of such factors as:
  - a highly educated and experienced environmental workforce;
  - the presence of major educational and research institutions; and
  - the proven track record of B.C. companies from work conducted in Canada and abroad.

. With some assistance in marketing and financing during the industry's current development stage, we are confident that the environmental industry has the potential to be an even greater contributor to the B.C. economy.

SUMMARY AND RECOMMENDATIONS

- The Environmental industry is a young but growing and important sector of the world economy.

- The industry's growth is a result of the growing need to manage the negative impacts of urbanization, industrialization, and population growth on man's natural environment.

- With these impacts increasing in measure from year to year, it is evident that the demand for technology and expertise to deal with environmental concerns will also increase in the 1990s and beyond.

- British Columbia firms are well positioned in this developing international market because of expertise, reputation, and location.

- Outlined below are a number of strategies and initiatives that we recommend be considered to further build the B.C. environmental industry's position in the export market.

ACTION PLAN

- Continue to assist the Canadian Environmental Industry Association in its development.

- Encourage firms to form export consortia.

- Facilitate cooperative arrangements between environmental consulting firms and consulting engineers which do not provide in-house environmental services. (Engineering firms are, because of their size and broad range of services, often in a better position to recognize opportunities for environmental work.)

- Focus on particular industry sectors such as forestry, fisheries, mining, environmental mapping, where B.C. firms have particular strengths.

- Conduct specialized overseas project development tours for environmental industry specialists.

- Improve and facilitate export financing for environmental firms from government agencies and private financial institutions.

- Simplify CIDA funding process and ensure geographic equity of CIDA funding within Canada.

- Endeavour to establish a CIDA office in Western Canada.

- Obtain listings from CIDA of all projects being funded by agencies throughout the world for use as an opportunity prospecting list by environmental firms (i.e. new development creates new environmental demands).

- Help qualified firms to gain experience on CIDA projects as an introduction to international work.

- Endeavour to facilitate cooperation between scientific, engineering, and other research faculty, staff, and facilities from B.C. universities in export development initiatives with private firms in the environmental industry.

- Circulate this report to B.C. post secondary institution deans of engineering and science faculties to encourage staff and student interest in environmental industry careers.

AREAS FOR FURTHER RESEARCH

In addition to the above action plans, we recommend that the following initiatives be considered by APIAC and the Provincial Government to foster the development of this high potential industry:

- Investigate export assistance programs provided by governments in other Western countries.

- Fund the development of publications such as overseas contact directories and market information guides to assist companies in their international marketing efforts.

- Provide seminars on how to market environmental services and products overseas.

- Provide coaching on how to obtain work through major international funding agencies such as CIDA, the World Bank and the Asian Development Bank. Emphasize the importance these agencies attach to technology transfer and training.

- Encourage CIDA and other international funding agencies to sensitize developing countries to environmental concerns in order to increase environmental awareness and markets within these countries.

* * * * *

We wish to express our appreciation to the many companies which contributed to this study; to Environment Canada, Statistics Canada and the Department of Regional Industrial Expansion for their assistance in defining the industry and in identifying industry members; and to APIAC for funding this important initiative. A partial list of the people who assisted with our research is provided in Appendix E.

Price Waterhouse,
management consultants
Vancouver, B.C.
March 31, 1988

APPENDIX A

LIST OF SURVEY PARTICIPANTS

ALPHABETICAL LISTING OF BRITISH COLUMBIA ENVIRONMENTAL COMPANIES

A. Lanfranco and Associates
A.E.D. Manufacturing & Mechanical Installations Ltd.
Aanderaa Instruments Ltd.
ABC Recycling
Alchem Inc.
Alexander Boome Consulting Engineering (1982) Ltd.
Anderson Industrial Ventilation Ltd.
Applied Microsystems Ltd.
Aqua Guard Sales Inc.
Aquares Systems Ltd.
Arcas Associates, Consulting Archaeologists and Anthropologists
Archipelago Marine Research
Arctic Sciences Ltd.
ASL Analytical Service Laboratories Ltd.
Associated Engineering
B. H. Levelton & Associates Ltd.
B.C. Research
Barrday Western
Barron Kennedy Lyzun & Associates Ltd.
Bennett Environmental Consultants Ltd.
Buchanan Consulting Services
C.D. Schultz & Company Limited
Canber Industries Limited
CB Research International Corporation
Civic Consulting Group Ltd.
Coast Forest Management Ltd.
Condor Earth Technologies
Connor Development Services Ltd.
Cornerstone Planning Group Limited
Counterspil Research Inc.
CPI Equipment Ltd.
D. McLeay & Associates Ltd.
D.F. Dickins Associates Ltd.
D.W. Thomson Consultants Ltd.
Dayton & Knight Ltd.
Don Ference & Associates Ltd.
E.H. Hanson & Associates Ltd.
E.P.S. Environmental Protection Systems Ltd.
E.S.R. Holdings Ltd.
E.V.S. Consultants Ltd.
Entech Environmental Consultants Ltd.
Envirochem Services
Envirocon Pacific Limited
Enviroscience Products Ltd.
ESSA-Environmental and Social Systems Analysts Ltd.
First Watercount Systems Ltd.
Frederick Goertz Ltd.
Frontier Consulting Ltd.
G.A. Tzvetcoff Engineering
G.G. Runka Land Sense Ltd.

ALPHABETICAL LISTING OF BRITISH COLUMBIA ENVIRONMENTAL COMPANIES

Godek Developments Inc.
Gordon A. Jones
H.A. Simons Ltd.
H.D. Fowler Co. Ltd.
Hardy BBT Limited
Hatfield Consultants Ltd.
Holmsen Forestry Ltd.
Hornal Consultants Ltd.
Hugh Hamilton Ltd.
Ian Lambton & Associates Ltd.
Industrial Forestry Service Ltd.
Inland Timber Management (1984) Ltd.
Interior Weather Services Ltd.
International Paper Industries Ltd.
IPEC Consultants Ltd.
J.C. Lee and Associates Ltd.
Kent Engineering Ltd.
Ker, Priestman & Associates Ltd.
Kerr Wood Leidal Associates Ltd.
Kilborn Engineering (B.C.) Ltd.
KLM Engineering Ltd.
Laing & McCulloch Forest Management Services
LGL Limited - Environmental Research Associates
Limnotek Research & Development Inc.
MacDonald Dettwiler
MacLaren Plansearch Corp.
McCrae Engineering Consultants Ltd.
Microtek Research & Development Ltd.
Mohawk Lubricants (A Division of Mohawk Oil Co. Ltd.)
Morris Industries Ltd.
Morrow Engineering Ltd.
Nawitka Resource Consultants Ltd.
Nevin Sadlier-Brown Goodbrand Ltd.
Nilex Geotechnical Products Inc.
NovaTec Consultants Inc.
Okanagan Metals Ltd.
Pacific Metals Ltd.
Pacific Ocean Sciences Ltd.
Pacific Soil Analysis Incorporated
Patella Environment Services Ltd.
Peter Barrett Consultants (International) Inc.
Phillips Barratt Kaiser Engineering Ltd.
Professional Components Ltd.
Pumps & Power Ltd.
Quadra Planning Consultants Ltd.
Quantalytics Inc.
R. D. Lewis & Associates Ltd.
R. John Morgan Engineering Ltd.
R.B.H. Cybernetics (1970) Ltd.
R.L. Caesar & Associates Ltd.

ALPHABETICAL LISTING OF BRITISH COLUMBIA ENVIRONMENTAL COMPANIES

R.M. Herring, Forest Industry Consultant
Ramsay Machine Works Ltd.
Reid Crowther and Partners
Reid, Collins and Associates Limited
Rescan Environmental Services Ltd.
RSI Robotic Systems International Ltd.
S.N. McLean Forestry Services Ltd.
Sandwell Swan Wooster Inc.
Sanitherm Engineering Limited
Seacology
Seaconsult Marine Research Ltd.
Sierra-Misco Environment (Canada) Ltd.
Sigma Resource Consultants Ltd.
Silvatech Consulting Ltd.
Simon Day Ltd.
Soilcon Laboratories Ltd.
Solway Energy Corporation
Steffen Robertson & Kirsten (B.C.) Inc.
Susan Abs
Sutek Services Ltd.
Sylvametrics Consulting
Syndel Laboratories Ltd.
Synfuel Conversion Systems Ltd. (SynCon)
T.M. Thomson & Associates Ltd.
Talisman Land Resource Consultants
Terrascience Systems Ltd.
Urban Systems Ltd.
Vancouver Divers & Contractors Ltd.
Versatech Products Inc.
W.L. Puckering Consulting Ltd.
Western Canada Hydraulic Laboratories Ltd.
Western Ecological Services Ltd.
Westlund International Technologies Inc.
Willis, Cunliffe, Tait & Company Ltd.
Wood Laboratory (1984) Ltd.
Wright Engineers Limited

INDUSTRY DEFINITION

INDUSTRY DEFINITION

The following breakdown of services within eight broad industry sectors was utilized to classify industry members. The database resulting from this study is able to index all companies which identified themselves as having expertise in any one of the sector categories.

A. Consulting

a) Engineering
- . agricultural
- . chemical/process
- . energy conservation
- . fisheries
- . forestry
- . geology/mining
- . ocean engineering
- . pollution control
- . sanitation
- . water supply
- . other

b) Science
- . agriculture
- . aquaculture
- . archaeology
- . atmospheric sciences
- . biotechnology
- . cartography/resource mapping
- . fisheries
- . forestry
- . geology
- . marine biology
- . oceanography
- . physics
- . resource economics
- . socio-economics
- . soils and terrain
- . toxicology
- . wildlife
- . other

c) Professional
- . legal
- . financial
- . other

d) Design of computer information systems and software specifically intended for the management and analysis of environmental data:
   . algorithms
   . computer modelling
   . contingency plans
   . data bases
   . emergency response plans
   . geographical information systems/computer mapping
   . environmental impact assessment
   . resource economics and evaluation
   . sensitivity mapping
   . statistical analysis
   . training programs
   . other

e) Noise and radiation measurement services

f) Services relating to the detection, measurement and monitoring of pollutants
   . air
   . water
   . other

g) Land quality assessment and monitoring

h) Water quantity/quality monitoring

i) Climatological research

j) Mapping and remote sensing activities

k) Other Consulting

B. <u>Manufacturing</u>

a) Pollution control equipment/supplies
   . air
   . water
   . other

b) Waste Management equipment/supplies
   . solid
   . sewage
   . industrial/hazardous

c) Other equipment/supplies
   . water treatment
   . noise abatement
   . chemical treatment
   . other

C. Distribution

a) Pollution control equipment/supplies
   . air
   . water
   . other

b) Waste Management equipment/supplies
   . solid
   . sewage
   . industrial/hazardous

c) Other equipment/supplies
   . water treatment
   . noise abatement
   . chemical treatment
   . other

D. Laboratory Research

a) Toxic impact and measurement methodology

b) Pollutant measurement

c) Other

E. Recycling/Conservation

a) Resource use planning and management

b) Reforestation and other forestry management

c) Fisheries and wildlife management programs

d) Conservation practices for agricultural lands

e) Reduction of water consumption

f) Recycling
   . metal
   . paper
   . oil
   . biomass
   . consulting
   . other

g) Alternate energy systems:
   . solar
   . wind
   . geothermal
   . other

h) Other

F. Environmental Enhancement

a) Design and construction of potable water treatment and supply systems

b) Restoration and rehabilitation of major water systems

c) Oil spill and other site clean-up

d) Reclamation techniques
   . revegetation
   . acid generation control
   . ground water control
   . other

e) Other

G. Pollution Abatement and Control (Environmental Protection)

a) Preparation of environmental impact assessments

b) Participation in the public environmental review process

c) Research into the effect of potentially toxic substances on the natural environment

d) Research into the reduction or avoidance of pollutants

e) Research and industrial design of processes and products primarily intended to reduce emissions and waste generation

f) Other

H. Waste Management (Environmental Protection)

a) Waste collection
   . residential
   . commercial
   . industrial

b) Toxic waste handling and transport

c) Treatment of waste prior to storage or disposal (e.g. solidification, encapsulation, incineration)

d) Other

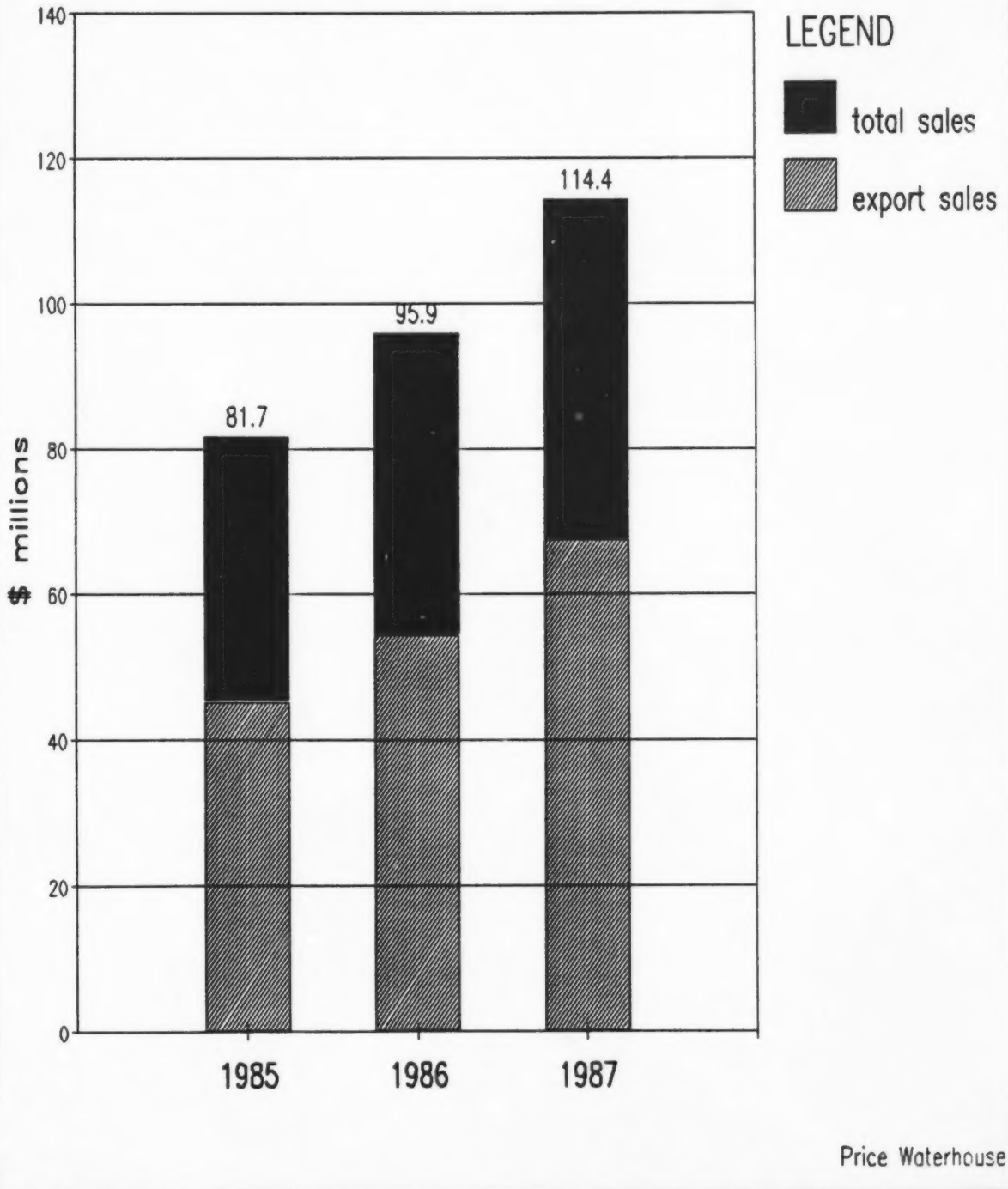
ECONOMIC PROFILE

B.C. ENVIRONMENTAL INDUSTRY
ECONOMIC PROFILE
1985 - 1987

($000's)

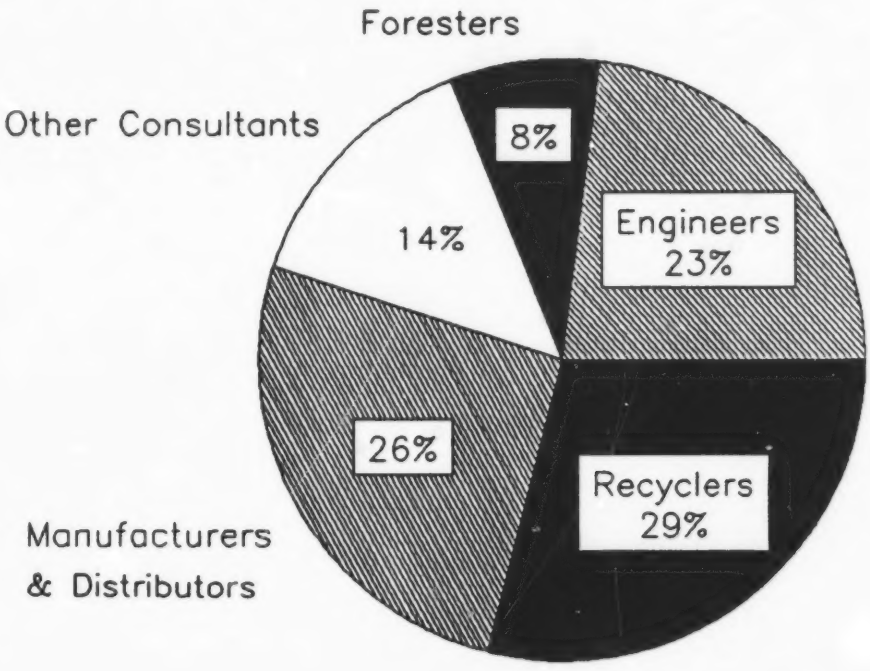
	1985	1986	1987
Sales	$81,692	$95,902	$114,428
Exports			
United States	22,606	25,786	31,020
Central/South America	840	812	3,506
Europe	714	840	1,887
Africa	4,003	4,714	5,762
Asia Pacific	16,370	21,786	24,919
Asia (other)	805	612	521
Total Exports	$45,338	$54,550	$ 67,615
Exports as a % of Sales	55%	57%	59%
% Sales Increase	-	17%	19%
% Exports Increase	-	20%	24%

B.C. Environmental Industry Sales and Exports 1985–1987



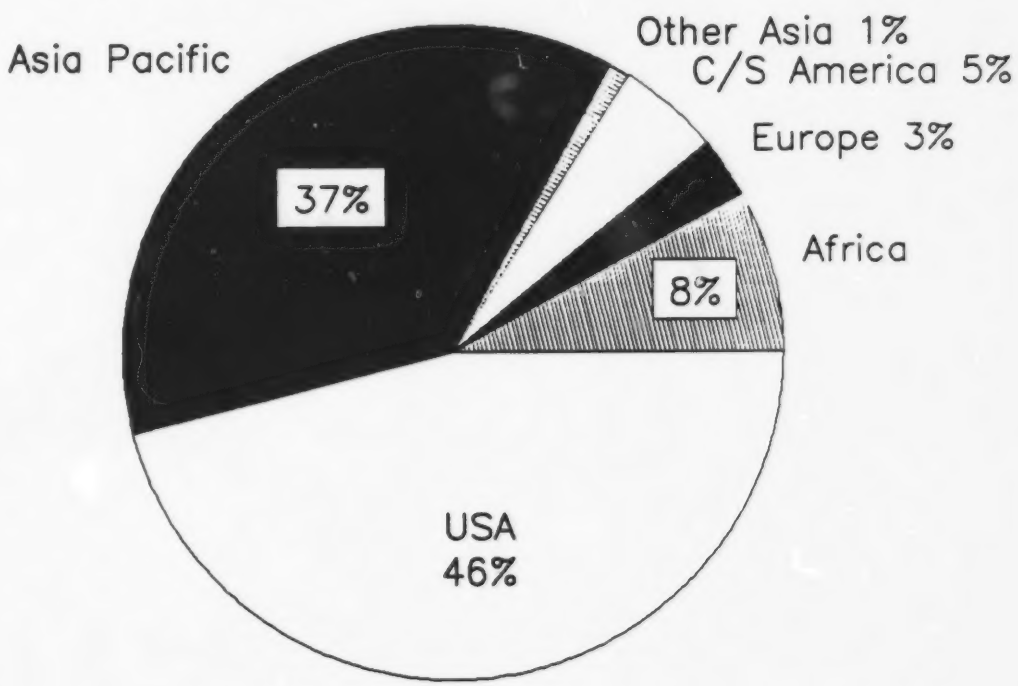
Price Waterhouse

B.C. Environmental Industry 1987 Sales by Respondent Group



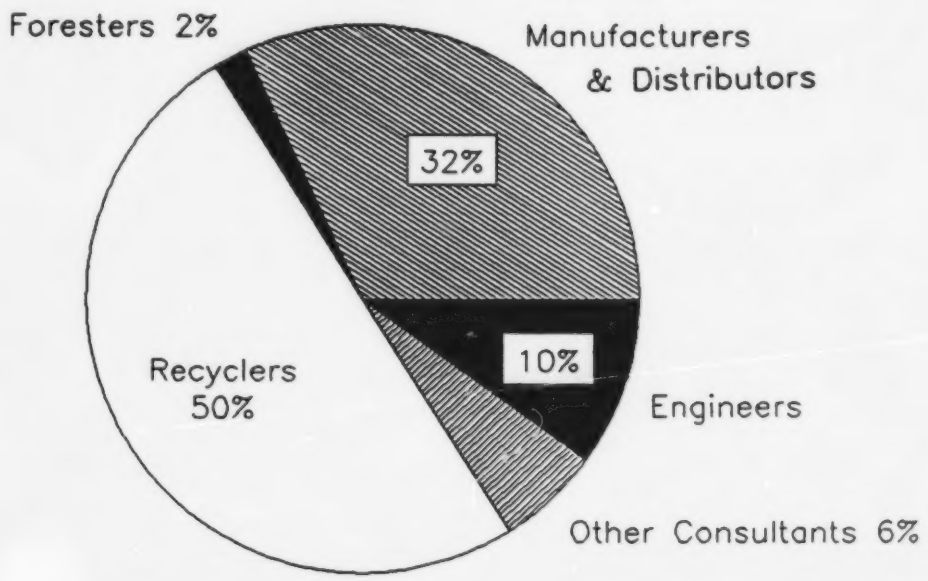
Price Waterhouse

B.C. Environmental Industry
1987 Export Markets



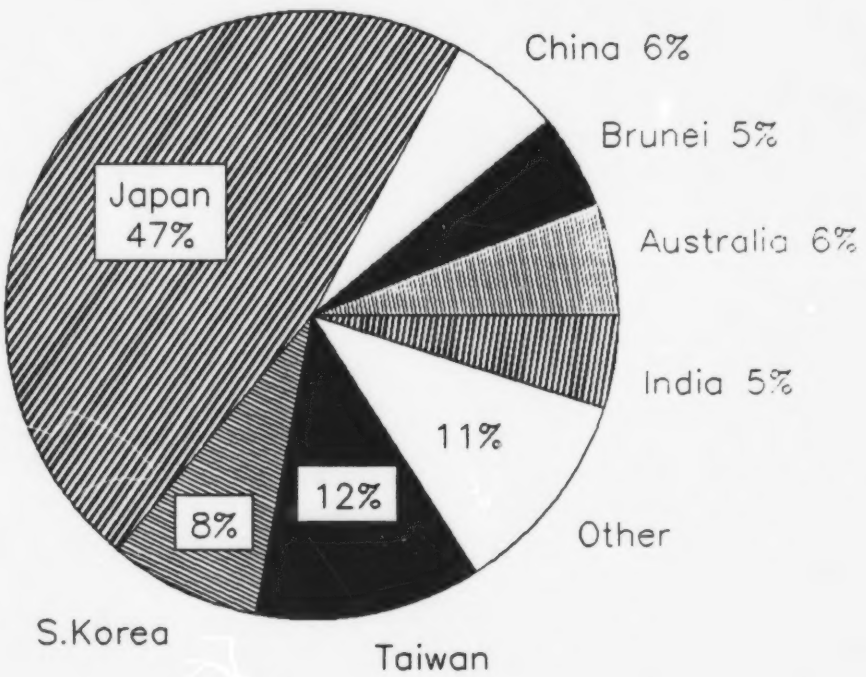
Price Waterhouse

B.C. Environmental Industry 1987 Exports by Respondent Group



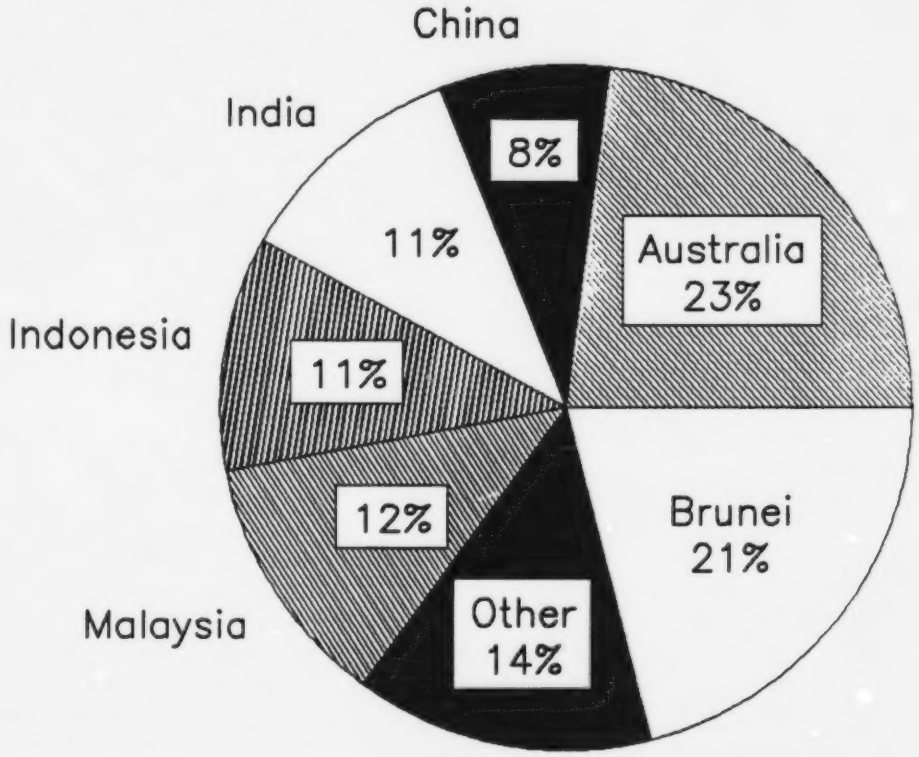
Price Waterhouse

B.C. Environmental Industry
1987 Asia Pacific Exports



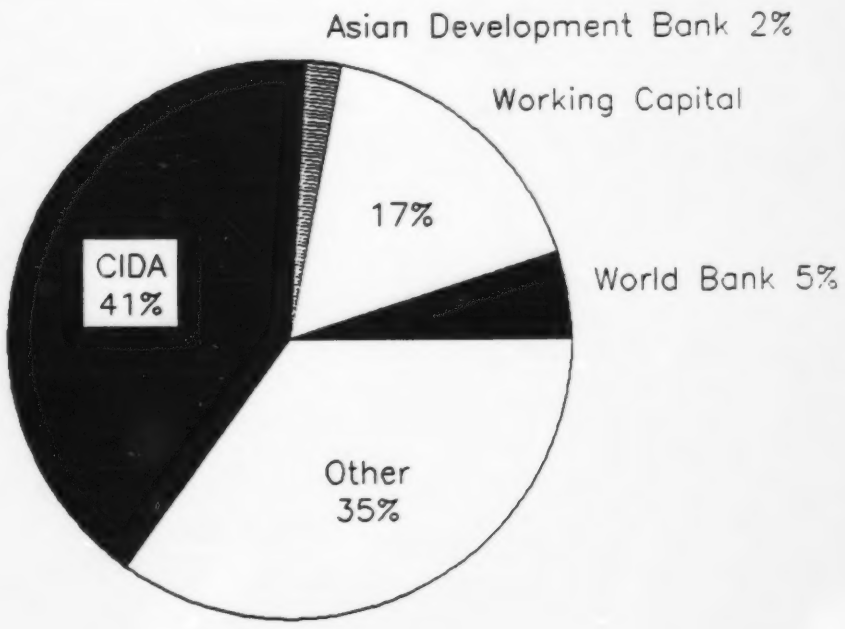
Price Waterhouse

B.C. Environmental Industry 1987 Asia Pacific Exports (excluding recyclers)



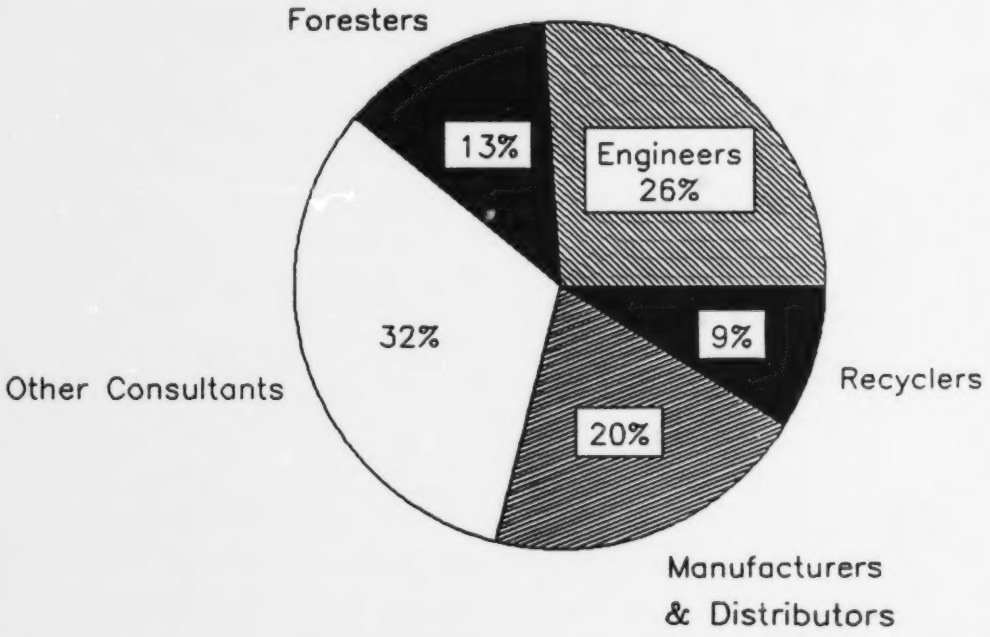
Price Waterhouse

B.C. Environmental Industry 1987 Export Financing Sources for Consulting Firms



Price Waterhouse

B.C. Environmental Industry 1987 Employment by Respondent Group.



Price Waterhouse

APPENDIX D

SURVEY SUMMARIES REGARDING

EXPORT CONSTRAINTS AND EXPORT SUGGESTIONS

EXPORT CONSTRAINTS AND EXPORT SUGGESTIONS

This appendix summarizes the responses made by the companies in our survey to two questions regarding the exporting of environmental goods and services.

Because companies were surveyed independently and were not prompted for specific responses, common responses of even 10% to these open-ended questions are significant. In addition, if 10% of the companies identified a common area of concern, it does not follow that the other 90% is not concerned with this issue.

CONSTRAINTS TO EXPORTS

Companies were asked the open-ended question: "What problems or constraints does your firm (and industry) face in securing and performing work for clients outside Canada?" Of the 133 companies which submitted completed questionnaires, 99 chose to respond to this question with one or more responses. These responses are summarized below:

Respondent Themes	Number of mentions	Mentions as a % of total companies responding (99)
Business Development Costs Constraints		
Lack of time and money resources to actively pursue international work; long lead times, high market development costs, and red tape are disincentives.	48	49%
Funding Agency and Financing Issues Constraints		
CIDA gives preference to Eastern firms; it is expensive to secure CIDA contracts from Vancouver; funding agencies are slow and bureaucratic; funding agencies overlook small, specialist firms; Canadian agency funding is insufficient.	16	16%

Respondent Themes	Number of mentions	Mentions as a % of total companies responding (99)
Funding Agency and Financial Issues Constraints (continued)		
Difficulty obtaining financing with reasonable costs and terms.	12	12%
Foreign Market Constraints		
Unfamiliar with market's needs; do not have established network of overseas contacts to identify leads; lack international experience, particularly in marketing.	20	20%
Difficulty in obtaining working visas, overcoming trade barriers and dealing with foreign business practices and legal requirements; currency problems.	12	12%
Difficulty in obtaining qualified foreign sales representatives or partners; do not have overseas presence.	11	11%
Difficulty in competing with government subsidized foreign firms.	6	6%
Language and culture barriers.	5	5%
Foreign markets are too immature to purchase these services and are unaware of their need for environmental management; foreign clients want more than they are willing to pay for.	5	5%
Internal Industry Constraints		
Industry members do not take advantage of co-operation opportunities.	1	1%
Industry members and domestic firms are not aware of the services available from small, specialist environmental firms nor the need for them.	1	1%

SUGGESTIONS FOR ENCOURAGING EXPORTS

Companies were also asked for their opinions on what can be done to increase exports and to overcome export constraints. For this question, 79 companies responded with one or more suggestions. The common themes of these suggestions are summarized below.

Respondent Themes	Number of mentions	Mentions as a % of total companies responding (79)
Government should assist industry with business development and marketing expenses, with identifying overseas contacts through business development tours and trade directories, and by providing market information	25	32%
Government should provide more liberal and accessible financing; more agency and R&D funding for environmental projects at internationally competitive levels; less bureaucracy and more responsiveness in providing funds; assistance in securing financing for exports.	20	25%
Firms should co-operate more, form consortia, hire B.C. sub-contractors, work through their industry associations, dialogue more with government and aid agencies, provide package services.	18	23%
There needs to be a more equitable distribution of CIDA funds; CIDA should have a senior representative on the West Coast to keep the industry informed of opportunities and to assist in securing funding for companies in the West.	8	10%
Government should set up or support permanent business centres or trade representatives overseas; embassies and trade offices should play stronger marketing role; local experienced business people should be hired to work in trade offices; government should concentrate its marketing efforts on specific areas of the world.	7	9%

Respondent Themes	Number of mentions	Mentions as a % of total companies responding (79)
Foreign decision makers, Canadian businessmen, and Canadian government agencies need to be educated regarding the importance of environmental management and the capabilities of Canadian firms.	6	8%
B.C. firms should form joint ventures with foreign firms, acquire local agents.	5	6%
Canadians need to be educated regarding Asian cultures and languages.	3	4%
There is a need for more direct contact between environmental experts and potential customers; the number of government and industry middlemen should be reduced.	2	2%

APPENDIX E

LIST OF RESEARCH CONTACTS

LIST OF RESEARCH CONTACTS

Mr. Patrick Lennon	Department of Regional Industrial Expansion, Ottawa
Mr. Andrew Fabro	Environment Canada, West Vancouver
Mr. Andre Guay	Environment Canada, Ottawa
Mr. Kirk Hamilton	Statistics Canada, Ottawa
Mr. Charles Lyon	Statistics Canada, Ottawa
Dr. Noel Boston	Bennett Environmental Consultants Ltd., Vancouver
Mr. Dan Schroeter	Talisman Land Resource Consultants, Vancouver
Dr. John Foster	MacLaren Plansearch Corp., Vancouver
Mr. Graham Seagel	Sutek Services Ltd., North Vancouver
Mr. Dennis Konasewich	Envirochem Services, Burnaby

THE ASIA PACIFIC INITIATIVE

On December 16, 1986, federal and provincial ministers signed a Memorandum of Understanding (M.O.U.) calling for the coordination of initiatives to enhance British Columbia and Vancouver as Canada's Pacific Centre for trade, commerce and travel. The M.O.U. was later designated as the Asia Pacific Initiative.

On June 2, 1987, the Asia Pacific Initiative Advisory Committee (APIAC) – drawn from the private sector – was established to advise federal and provincial ministers of initiatives that might be undertaken to achieve the objectives of the M.O.U. This advice is transmitted by the APIAC to the federal-provincial Pacific Council of Ministers through a Ministerial Executive Committee that meets regularly with the APIAC.

The APIAC has appointed task forces that are addressing opportunities and advising the Governments of Canada and British Columbia in the areas of international finance, trade, transportation, tourism, cultural and social impact and the export of professional services. More than 100 volunteers from the private sector are engaged in this work.

ASIA PACIFIC INITIATIVE